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10/655,023	09/05/2003	Rupert Maier	32860-000604/US	6040

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EXAMINER	
MAI, KEVIN S	

ART UNIT	PAPER NUMBER
2152	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/655,023	MAIER ET AL.	
	Examiner	Art Unit	
	KEVIN S. MAI	2152	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☒ Claim(s) *1* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 September 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/5/03, 4/29/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-26 have been examined and are pending.

Drawings

2. The drawings are objected to because they fail to show necessary textual labels of features or symbols in Figs. 3 and 4 as described in the specification. For example, placing a label, "Negotiate Master Node", with element 1 of Fig. 3, would give the viewer necessary detail to fully understand this element at a glance. A descriptive textual label for each numbered element in these figures would be needed to better understand these figures without substantial analysis of the detailed specification.

Claim Objections

3. Claim 1 is objected to because of the following informalities: Claim 1 recites "wherein each of the first three method steps are performed my by the master". It would appear the applicant intended for the limitation to state "by the master" and not "my by the master". Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 2, 4-8, 12, 14, 16, 17, 19, 20 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat. No. 6351821 to Voth (hereinafter "Voth") and further in view of US Pat. No. 7051090 to Chen (hereinafter "Chen").

6. **As to Claim 1,** Voth discloses **a method for synchronizing network nodes in a subnetwork, where the network nodes have timers and at least one of the network nodes undertakes the function of a master, the time on the master being used as the reference time for the subnetwork, the method comprising:**
Voth-Chen does not explicitly disclose **insuring no unauthorized communication takes place in the subnetwork;**

However, Chen discloses this (Column 10 lines 20-25 of Chen disclose to avoid congestion affecting voice data the system will throttle back data traffic to guarantee smooth voice transmission. This is seen to be effectively insuring no unauthorized communication taking place since all other data other than the voice transmission could be throttled to being stopped in order to guarantee the quality of the voice transmission)

It would have been obvious to one of ordinary skill in the art at the time of invention to combine clock synchronization as disclosed by Voth, with throttling all other traffic as disclosed by Chen. One of ordinary skill in the art would have been motivated to combine because certain data is intolerant to transmission delay and a straightforward solution is to control the flow of traffic in the network in order to guarantee smooth transmission (Column 10 lines 10-15 of Chen).

Voth discloses **sending a delay-time measurement message to every network node in the subnetwork in order to ascertain a signal delay time** (Figure 6 of Voth discloses sending a SYNC message to the slave nodes (602))**;**

sending a time setting message to every network node (Figure 6 of Voth discloses sending an INFO message to the slave nodes (624)**; and**

aligning the time on the network nodes with the reference time for the subnetwork (Figure 6 of Voth discloses the slave nodes receiving the INFO message (626) and then scheduling their time adjustments)**,**

wherein each of the first three method steps are performed my by the master (Figure 6 of Voth discloses the master node performing those steps)**.**

7. **As to Claim 2,** Voth-Chen discloses the invention as claimed as described in claim 1**, further comprising storing the signal delay time for the network nodes in the master** (Column 11 lines 55-60 of Voth disclose each node in the cluster maintains a data repository and each repository includes one entry for each node. Figure 10 discloses that this repository contains entries for max delay (1016), min delay (1018) and average delay (1020))**.**

8. **As to Claim 4,** Voth-Chen discloses the invention as claimed as described in claim 1**, wherein the time on a network node is aligned with the reference time for the subnetwork immediately after reception of the time setting message** (Column 8 lines 20-25 of Voth disclose that on receipt of the INFO message the slave node uses the mark time field in the message to schedule the time at which the time clock will be updated. It is seen that it would

have been obvious for the mark time field to be set in such a fashion that the scheduled time to update would be immediately upon receipt of the message itself. Since the time at which to update the time clock is modifiable, having the time to update be the time of reception is an obvious variant for a system that wishes to make the synchronization process take as little time as possible).

9. **As to Claim 5,** Voth-Chen discloses the invention as claimed as described in claim 1, **wherein the time on a network node is aligned with the reference time for the subnetwork by way of a step-by-step basis** (Column 3 lines 10-15 of Voth disclose large adjustments in time are achieved by gradually retarding or advancing the time clocks within the slave nodes).

10. **As to Claim 6,** Voth-Chen discloses the invention as claimed as described in claim 1, **wherein at least one step is repeated a plurality of times** (Column 2 lines 50-55 of Voth disclose that the system uses a repeating update cycle. Thus it is seen that all steps are repeated a plurality of times).

11. **As to Claim 7,** Voth-Chen discloses the invention as claimed as described in claim 6, **characterized in that the master ascertains the signal delay time by sending a plurality of delay-time measurement messages and using formation of a mean** (Column 13 lines 23-50 of Voth disclose that the master node updates the delay variables each time it receives a SYNC message. Then since SYNC message are sent every cycle it is seen that the delay-time is

ascertained through a plurality of measurement messages. As to a mean being formed, column 13 line 45 discloses the formation of the average delay variable).

12. **As to Claim 8,** Voth-Chen discloses the invention as claimed as described in claim 1, **wherein the master ascertains all the network nodes which are part of the subnetwork** (Column 6 lines 20-21 of Voth disclose the method is done to synchronize all of the time clocks and slave nodes in the cluster. Furthermore column 11 lines 55-60 disclose each node in the cluster maintains a data repository and each repository includes one entry for each node. In view of these two facts the master must have ascertained all the nodes).

13. **As to Claim 12,** Voth-Chen discloses the invention as claimed as described in claim 2, **wherein the time on a network node is aligned with the reference time for the subnetwork immediately after reception of the time setting message** (Column 8 lines 20-25 of Voth disclose that on receipt of the INFO message the slave node uses the mark time field in the message to schedule the time at which the time clock will be updated. It is seen that it would have been obvious for the mark time field to be set in such a fashion that the scheduled time to update would be immediately upon receipt of the message itself. Since the time at which to update the time clock is modifiable, having the time to update be the time of reception is an obvious variant for a system that wishes to make the synchronization process take as little time as possible).

14. **As to Claim 14,** Voth-Chen discloses the invention as claimed as described in claim 2, **wherein the time on a network node is aligned with the reference time for the subnetwork by way of a step-by-step basis** (Column 3 lines 10-15 of Voth disclose large adjustments in time are achieved by gradually retarding or advancing the time clocks within the slave nodes).

15. **As to Claim 16,** Voth-Chen discloses the invention as claimed as described in claim 4, **wherein the time on a network node is aligned with the reference time for the subnetwork by way of a step-by-step basis** (Column 3 lines 10-15 of Voth disclose large adjustments in time are achieved by gradually retarding or advancing the time clocks within the slave nodes).

16. **As to Claim 17,** Voth-Chen discloses the invention as claimed as described in claim 2, **wherein the master ascertains all the network nodes which are part of the subnetwork** (Column 6 lines 20-21 of Voth disclose the method is done to synchronize all of the time clocks and slave nodes in the cluster. Furthermore column 11 lines 55-60 disclose each node in the cluster maintains a data repository and each repository includes one entry for each node. In view of these two facts the master must have ascertained all the nodes).

17. **As to Claim 19,** Voth-Chen discloses the invention as claimed as described in claim 4, **wherein the master ascertains all the network nodes which are part of the subnetwork** (Column 6 lines 20-21 of Voth disclose the method is done to synchronize all of the time clocks and slave nodes in the cluster. Furthermore column 11 lines 55-60 disclose each node in the

cluster maintains a data repository and each repository includes one entry for each node. In view of these two facts the master must have ascertained all the nodes).

18. **As to Claim 20,** Voth-Chen discloses the invention as claimed as described in claim 5, **wherein the master ascertains all the network nodes which are part of the subnetwork** (Column 6 lines 20-21 of Voth disclose the method is done to synchronize all of the time clocks and slave nodes in the cluster. Furthermore column 11 lines 55-60 disclose each node in the cluster maintains a data repository and each repository includes one entry for each node. In view of these two facts the master must have ascertained all the nodes).

19. **As to Claim 26,** Voth discloses **a method, comprising:**

Voth does not explicitly disclose **insuring no unauthorized communication takes place in a subnetwork;**

However, Chen discloses this (Column 10 lines 20-25 of Chen disclose to avoid congestion affecting voice data the system will throttle back data traffic to guarantee smooth voice transmission. This is seen to be effectively insuring no unauthorized communication taking place since all other data other than the voice transmission could be throttled to being stopped in order to guarantee the quality of the voice transmission)

Examiner recites the same rationale to combine used in claim 1.

Voth discloses **sending a delay-time measurement message to every network node in the subnetwork in order to ascertain a signal delay time** (Figure 6 of Voth discloses sending a SYNC message to the slave nodes (602));

sending a time setting message to every network node (Figure 6 of Voth discloses sending an INFO message to the slave nodes (624)**; and**

aligning the time on the network nodes with the reference time for the subnetwork (Figure 6 of Voth discloses the slave nodes receiving the INFO message (626) and then scheduling their time adjustments)**.**

20. Claims 3, 11, 13, 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Voth-Chen and further in view of US Pat. No. 6973622 to Rappaport et al. (hereinafter "Rappaport").

21. **As to Claim 3,** Voth-Chen discloses the invention as claimed as described in claim 1**.** Voth-Chen does not explicitly disclose **wherein a network node, upon receiving a delay-time measurement message, simulates the alignment of a time thereof with the reference time at least once, and then sends a response to the master.**

However, Rappaport discloses this (Column 23 lines 9-26 of Rappaport disclose finding the processing delays associated with each device in the network. Where processing delay is the time required for the network device to process data sent to it. This is seen to be the same as measuring delay by simulating the action because it is also measuring the processing delay of a device)

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of claim 1 as disclosed by Voth-Chen, with simulating the process of time alignment as disclosed by Rappaport. One of ordinary skill in the art would have been motivated

to combine to accurately predict round trip time of packets sent in the network (Column 23 lines 42-46 of Rappaport). Since synchronization relies highly on compensating for delay it would have been obvious to also account for the delay involved in actually processing the time alignment request)

22. **As to Claim 11,** Voth-Chen discloses the invention as claimed as described in claim 2**.** Voth-Chen does not explicitly disclose **wherein a network node, upon receiving a delay-time measurement message, simulates the alignment of a time thereof with the reference time at least once, and then sends a response to the master.**

However, Rappaport discloses this (Column 23 lines 9-26 of Rappaport disclose finding the processing delays associated with each device in the network. Where processing delay is the time required for the network device to process data sent to it. This is seen to be the same as measuring delay by simulating the action because it is also measuring the processing delay of a device)

Examiner recites the same rationale to combine used in claim 3.

23. **As to Claim 13,** Voth-Chen-Rappaport discloses the invention as claimed as described in claim 3**, wherein the time on a network node is aligned with the reference time for the subnetwork immediately after reception of the time setting message** (Column 8 lines 20-25 of Voth disclose that on receipt of the INFO message the slave node uses the mark time field in the message to schedule the time at which the time clock will be updated. It is seen that it would have been obvious for the mark time field to be set in such a fashion that the scheduled time to

update would be immediately upon receipt of the message itself. Since the time at which to update the time clock is modifiable, having the time to update be the time of reception is an obvious variant for a system that wishes to make the synchronization process take as little time as possible).

24. **As to Claim 15,** Voth-Chen-Rappaport discloses the invention as claimed as described in claim 3**, wherein the time on a network node is aligned with the reference time for the subnetwork by way of a step-by-step basis** (Column 3 lines 10-15 of Voth disclose large adjustments in time are achieved by gradually retarding or advancing the time clocks within the slave nodes).

25. **As to Claim 18,** Voth-Chen-Rappaport discloses the invention as claimed as described in claim 3**, wherein the master ascertains all the network nodes which are part of the subnetwork** (Column 6 lines 20-21 of Voth disclose the method is done to synchronize all of the time clocks and slave nodes in the cluster. Furthermore column 11 lines 55-60 disclose each node in the cluster maintains a data repository and each repository includes one entry for each node. In view of these two facts the master must have ascertained all the nodes).

26. Claims 9 and 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Voth-Chen as and further in view of US Pat. No. 6157957 to Berthaud (hereinafter "Berthaud").

27. **As to Claim 9,** Voth-Chen discloses the invention as claimed as described in claim 1**.** Voth-Chen does not explicitly disclose **wherein at least one network node in a subnetwork undertakes the function of the master in another subnetwork.**

However, Berthaud discloses this (Column 4 lines 34-35 of Berthaud discloses a master of several slaves may also be a slave of another master)

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of claim 1 as disclosed by Voth-Chen, with having a slave be a master of other slaves as disclosed by Berthaud. One of ordinary skill in the art would have been motivated to combine to make the system not reliant on a particular hierarchical organization (Column 4 lines 35-50 of Berthaud).

28. **As to Claim 21,** Voth-Chen discloses the invention as claimed as described in claim 2. Voth-Chen does not explicitly disclose **wherein at least one network node in a subnetwork undertakes the function of the master in another subnetwork.**

However, Berthaud discloses this (Column 4 lines 34-35 of Berthaud discloses a master of several slaves may also be a slave of another master)

Examiner recites the same rationale to combine used in claim 9.

29. **As to Claim 22,** Voth-Chen-Rappaport discloses the invention as claimed as described in claim 3. Voth-Chen does not explicitly disclose **wherein at least one network node in a subnetwork undertakes the function of the master in another subnetwork.**

However, Berthaud discloses this (Column 4 lines 34-35 of Berthaud discloses a master of several slaves may also be a slave of another master)

Examiner recites the same rationale to combine used in claim 9.

30. **As to Claim 23,** Voth-Chen discloses the invention as claimed as described in claim 4. Voth-Chen does not explicitly disclose **wherein at least one network node in a subnetwork undertakes the function of the master in another subnetwork.**

However, Berthaud discloses this (Column 4 lines 34-35 of Berthaud discloses a master of several slaves may also be a slave of another master)

Examiner recites the same rationale to combine used in claim 9.

31. **As to Claim 24,** Voth-Chen discloses the invention as claimed as described in claim 5. Voth-Chen does not explicitly disclose **wherein at least one network node in a subnetwork undertakes the function of the master in another subnetwork.**

However, Berthaud discloses this (Column 4 lines 34-35 of Berthaud discloses a master of several slaves may also be a slave of another master)

Examiner recites the same rationale to combine used in claim 9.

32. **As to Claim 25,** Voth-Chen discloses the invention as claimed as described in claim 8. Voth-Chen does not explicitly disclose **wherein at least one network node in a subnetwork undertakes the function of the master in another subnetwork.**

However, Berthaud discloses this (Column 4 lines 34-35 of Berthaud discloses a master of several slaves may also be a slave of another master)

Examiner recites the same rationale to combine used in claim 9.

33. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Voth-Chen and further in view of US Pub. No. 2003/0158971 to Renganarayanan et al. (hereinafter "Renganarayanan").

34. **As to Claim 10,** Voth-Chen discloses the invention as claimed as described in claim 1. Voth-Chen does not explicitly disclose **wherein the network nodes in a subnetwork are connected to one another by way of an optical transmission medium.**

However, Renganarayanan disclose this (Paragraph [0049] of Renganarayanan discloses generally networks are connected via optical fiber, coaxial cable and twisted pair connections)

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of claim 1 as disclosed by Voth-Chen, with using optical fibers as disclosed by Renganarayanan. One of ordinary skill in the art would have been motivated to combine because it is seen that it is generally known that networks are connected via optical fibers and as such it would have been obvious to use them to connect the network disclosed in Voth-Chen.

Conclusion

35. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 6324586 B1 - System for synchronizing multiple computers with a common timing reference to Johnson; Aric R.

US 20050210153 A1 - Method and apparatus for time synchronization in a network data processing system to Rich, Bruce Arland et al.

US 20050033862 A1 - Method for syncronization in networks to Blum, Philipp et al.

US 20030172179 A1 - System and method for performing clock synchronization of nodes connected via a wireless local area network to del Prado Pavon, Javier et al.

US 20030154309 A1 - Method for synchronizing computer clocks in networks used for information transmission, device for carrying out said method and data packet suitable for the synchronization of computer clocks to Kero, Nikolaus et al.

US 20020073228 A1 - Method for creating accurate time-stamped frames sent between computers via a network to Cognet, Yves et al.

US 7281061 B2 - Time managing apparatus for managing time to synchronize with other apparatuses to Takeda; Hideyuki

US 7260653 B2 - Method and device for the synchronization between two networks to Le Scolan; Lionel et al.

US 6535926 B1 - Time synchronization system for industrial control network using global reference pulses to Esker; Lawrence W.

US 6134234 A - Master-slave synchronization to Kapanen; Jouko Juhani

US 5907685 A - System and method for synchronizing clocks in distributed computer nodes to Douceur; John R.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEVIN S. MAI whose telephone number is (571)270-5001. The examiner can normally be reached on Monday through Friday 7:30 - 5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bunjob Jaroenchonwanit can be reached on 571-272-3913. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KSM

/Jeffrey Pwu/
Supervisory Patent Examiner, Art Unit 2146